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09/647281 Pct
Attorney Docket Number: 11796
532 Rec'd PCT/PTC 26 SEP 2000
PATENTS

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)**

International Application Number: PCT/SE99/00500

International Filing Date: 03/26/1999

Priority Date Claimed: 03/27/1998

Title of Invention: EXHAUST GAS FILTER TEMPORARILY ARRANGED AT A VEHICLE EXHAUST PIPE

Applicant(s) for DO/EO/US: SCANDFILTER AB

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items under 35 U.S.C. 371:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to immediately begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the international Application as filed (35 U.S.C. 371(c)(2)):
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English
7. ☐ Amendments to the claims of the International Application under PCT Article 19:
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made, however, the time limit for making such amendments has **NOT** expired.
 - d. ☐ have not been made and will not be made
8. ☐ A translation of the amendments to the claims under PCT Article 19(35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)):
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☒ will follow.
10. ☐ A translation of the Annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
11. ☒ Copy of the:
 - a. ☒ International Preliminary Examination Report.
 - b. ☒ International Search Report.
12. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
13. ☒ An Assignment document for recording with a separate cover sheet in compliance with 37 CFR 3.28 and 3.31:
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☒ will follow.
14. ☒ A **FIRST** preliminary amendment.
15. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter
18. ☐ Verified Small Entity Declaration
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau
 - c. ☐ will follow.
19. ☐ Other items of information:

20. ☒ 1 Sheet of drawings are enclosed.

21. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees as follows:

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| NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): | | | | TOTAL |
|--|---------------------------|-----------------------------|---------------------------|----------------------|
| <input type="checkbox"/> Search Report has been prepared by the EPO or JPO | | | | \$0 |
| <input type="checkbox"/> International Preliminary Examination fee paid to USPTO (37 CFR 1.482) | | | | \$0 |
| <input type="checkbox"/> No International Preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) | | | | \$0 |
| <input checked="" type="checkbox"/> Neither International Preliminary examination fee (37 CFR 1.482) nor International Search fee (37 CFR 1.445(a)(2)) paid to USPTO | | | | \$970 |
| <input type="checkbox"/> International Preliminary Examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) | | | | \$0 |
| <input type="checkbox"/> Surcharge for furnishing the oath of declaration later than 20 months from the earliest claimed priority date (37 CFR 1.492(e)) | | | | \$0 |
| <input type="checkbox"/> Surcharge for furnishing the oath of declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)) | | | | \$0 |
| <input type="checkbox"/> Processing fee for furnishing the English translation later than the 20 months from the earliest claimed priority date (37 CFR 1.492(f)) | | | | \$0 |
| <input type="checkbox"/> Processing fee for furnishing the English translation later than the 30 months from the earliest claimed priority date (37 CFR 1.492(f)) | | | | \$0 |
| <input type="checkbox"/> Assignment Recordal Sheet | | | | \$0 |
| | | | | |
| | Number of Claims Filed | Number of Claims Allowed | Number of Extra Claims | Rate per Extra Claim |
| Number of Dependent Claims Filed | 20 | 20 | 0 | \$18 |
| Number of Independent Claims Filed | 1 | 3 | 0 | \$78 |
| | | | | |
| | | Yes | No | Rate per Application |
| Number of Multiple Dependent Claims Filed | | | | \$260 |
| | | | | |
| Total Fees Enclosed for Large Entity | | | | \$970 |
| Total Fees Enclosed for Small Entity (1/2 of Large Entity) | | | | \$485 |

- a. ☒ A check in the amount of \$ 970 to cover the fee is enclosed
b. ☐ Please charge my deposit account \$ 0 to cover the above fees. A duplicate copy of this sheet is enclosed.
c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, including request for extension and payment of extension fees due, when this is not explicitly requested by applicants, with a view toward avoidance of abandonment, to Deposit account No. 04-2219, referencing our docket # 11796. Any overpayment should be credited to this account.

Please direct all communication in connection with this application to the undersigned at:

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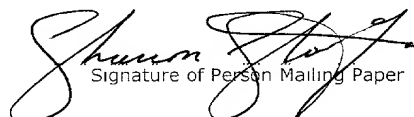
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CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this transmittal letter and the documents referred to as enclosed therein are being deposited with the United States Postal Service on September 26, 2000, in an envelope as "Express Mail Post Office Addressee", mailing label number EL226803671US addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Sharon Stolf
Name of Person Mailing Paper



Signature of Person Mailing Paper

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: SCANDFILTER AB

Serial Number: to be assigned

PCT Application Number: PCT/SE99/00500

Filed: 03/26/1999

Title: EXHAUST GAS FILTER TEMPORARILY ARRANGED AT A VEHICLE EXHAUST PIPE

Attorney Docket Number: 11796

PRELIMINARY AMENDMENT

Hon. Commissioner of
Patents and Trademarks
Box PCT
Washington, D.C. 20231

September 26, 2000

Sir:

Please amend the newly submitted application described above as follows:

In the Claims:

Please amend the claims as follows:

- Claim 6, line 1, delete "any one of claims 2-5" and insert --claim 2--.
- Claim 7, line 1, delete "any one of the preceding claims" and insert --claim 1--.
- Claim 9, line 1, delete "any one of the preceding claims" and insert --claim 1--.
- Claim 10, line 1, delete "any one of claims 2-9" and insert --claim 2--.
- Claim 11, line 1, delete "any one of the preceding claims" and insert --claim 1--.

Please add the following new claims:

- 16. A device according to claim 3, characterized in that the filter housing is made in the shape of a tube (4) or sleeve.
- 17. A device according to claim 2, characterized in that said body (3) comprises activated carbon combined with a carrier material.
- 18. A device according to claim 2, characterized in that said first part comprises a microfilter (2), such as a HEPA filter.

19. A device according to claim 3, characterized in that the first (2) and the second (3) parts are attached to the filter housing (4) by means of gluing.

20. A device according to claim 2, characterized by a fastening member (5) for attaching the filter unit (1) to the exhaust gas system of the vehicle in question by means of an adapter.

REMARKS

The foregoing amendments are primarily for the purpose of eliminating multiple dependencies, and placing the claims in proper form.

Respectfully submitted,



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EXHAUST GAS FILTER TEMPORARILY ARRANGED AT A VEHICLE
EXHAUST PIPE

Field of the Invention

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The present invention relates to a device for cleaning exhaust gases from vehicles, especially cars, which is intended to be temporarily arranged adjacent to the exhaust pipe of the vehicle, comprising a filter unit with a first part for separation of particles and a second part for separation of gaseous pollutants, such as hydrocarbons, the filter unit also comprising a filter housing, in which the first and second parts are arranged. This exhaust gas cleaning device is preferably intended to be used as a temporary filter for separating particulate and gaseous pollutants from vehicles when they are transported from vehicle manufacturing plants or when they are driven indoors, for example in car showrooms and workshops.

Background of the Invention

Presently, in order to avoid exhaust gases in, for example, a car showroom use is made of exhaust gas cleaning devices which are temporarily arranged on the exhaust pipe of the cars. These devices usually have a particle filter for separating particulate pollutants as well as a carbon filter for removing gaseous pollutants. Since new engines contain a large amount of hydrocarbons, the carbon filters of the exhaust gas cleaning devices have a short life and, consequently, the devices can only be reused a small number of times.

One problem associated with this technology is thus that a large number of polluted exhaust gas cleaning devices are produced, which because of their carcinogenic contents of polycyclic aromatic hydrocarbons are designated as hazardous waste and which, accordingly, cannot be deposited at an ordinary municipal refuse tip.

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Another problem associated with the carbon filters of prior art exhaust gas cleaning devices is that the degree of separation of the gaseous pollutants is low.

Summary of the Invention

5 The object of the present invention is to solve the problems described above by simplifying the disposal of the exhaust gas cleaning devices after use as well as increasing the degree of separation of the gaseous pollutants.

10 This object is achieved according to the invention by a device of the type described in the introductory paragraph, characterised in that the filter unit is made of a material which is completely destructible by means of incineration and that the second part comprises a
15 body, containing immobilised activated carbon evenly distributed in the body.

 Since the filter unit of the device is composed of a material which is completely destructible by means of incineration, the entire filter unit can be incinerated
20 in a conventional refuse incinerator, whereby the material including the harmful hydrocarbons is decomposed into innocuous, gaseous residual products.

 That fact that said body contains evenly distributed activated carbon results in better utilisation of the
25 activated carbon. Moreover, since the activated carbon is immobilised, high and safe gas filtering is achieved with no risk of gas leakage due to settlements in the carbon body. In other words, compaction of carbon particles is prevented during operation. Compaction of the carbon particles is undesirable since it would result in the formation in the carbon body of areas without carbon particles and consequently without the ability to separate gaseous
30 pollutants, i.e. the gaseous pollutants would not be removed from the part of the exhaust gases which would
35 flow through these areas. The total degree of separation would thus be relatively low.

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The filter unit of the device preferably comprises a filter housing, in which the first and second parts can be arranged.

5 The filter housing is made of a material which is completely destructible by means of incineration. The filter housing can be made of cardboard or of a combustible polymer, such as a recovered polymer or polypropylene. The filter housing is suitably made in the shape of a tube or a sleeve.

10 Said body preferably comprises an activated carbon combined with a carrier material and the activated carbon is suitably cross-linked with a polymer.

Said first part preferably comprises a microfilter, such as a HEPA filter.

15 The first and second parts are suitably attached to the filter housing by means of gluing.

The device preferably comprises a fastening member for attaching the filter unit to the exhaust gas system of the car by means of an adapter.

20 The fastening member can be made of a material which is completely destructible by means of incineration, such as a combustible polymer. The polymer may consist of a recovered polymer or polypropylene.

Brief Description of the Drawings

25 The invention will be described in more detail below with reference to the accompanying schematic drawing, which by way of example shows a part section of a presently preferred embodiment of the device according to the invention.

Description of a Preferred Embodiment

30 The device according to the preferred embodiment comprises a filter unit 1 with a first part 2 for separation of particles present in exhaust gases from a vehicle, such as a car, (not shown) as well as a second
35 part 3 for separation of gaseous pollutants present in these exhaust gases, such as polycyclic aromatic hydrocarbons. The first part comprises a microfilter 2, such

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as a HEPA filter, in the form of a pleated filter sheet made of a fibre material, such as polyester. The second part, however, comprises a carbon body 3 containing immobilised activated carbon evenly distributed in the body.

- 5 The activated carbon is cross-linked with a polymer in order to form of a homogeneous, self-supporting round of activated carbon.

Furthermore, the filter unit comprises a filter housing 4 in the form of a cardboard tube, in which the
10 microfilter 2 and the carbon body 3 are arranged. More specifically, the microfilter and the carbon body are bonded to the inside of the cardboard tube by means of hot melt adhesive in such a way that they abut against each other and, moreover, from the point of view of the
15 flow direction of the exhaust gases, indicated by the flow arrow F in the drawing, the carbon body is located downstream of the microfilter. On the side which does not abut against the microfilter, the carbon body is located a short distance upstream of the downstream end of the
20 cardboard tube. Furthermore, the inside of the cardboard tube is coated with a layer of, for example, silicate paint in order to enable the hot exhaust gases to flow through the cardboard tube without destroying it while at the same time ensuring that the tube is destructible by
25 means of conventional waste incineration.

The device also comprises a fastening member 5, which is provided with a surrounding track 6 at its downstream end, in which track the downstream end of the cardboard tube 4 is attached by means of a hot melt
30 adhesive. At its upstream end, the fastening member is attached to the exhaust pipe of a vehicle by the intermediary of a conventional adapter (not shown), the fastening member being attached to the adapter by means of, for example, a bayonet catch. The fastening member is made of
35 a material which is completely destructible by means of incineration, such as polypropylene or a recovered poly-

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mer consisting of a mixture of conventional recovered plastics, such as HDPE, LDPE, PP, etc.

In use, the exhaust gas cleaning device is thus arranged adjacent to the exhaust pipe of the vehicle and exhaust gases flow through it when the vehicle is being driven in, for example, a car showroom. When the exhaust gases first pass through the microfilter 2 of the filter unit 1, their particulate pollutants, such as soot particles, are separated first. Subsequently, their gaseous pollutants, such as polycyclic aromatic hydrocarbons, are separated from the exhaust gases in the carbon body 3 of the filter unit 1. Since the activated carbon particles of the carbon body are evenly distributed in the entire body and since they are also locked in position, compaction of the same is avoided, whereby it is ensured that the entire exhaust gas flow must pass through the adsorbing carbon particles. In this way, high separation of gaseous pollutants is achieved.

Subsequently, when the vehicle is to be delivered to the buyer in question, the exhaust gas cleaning device is removed together with the adapter from the exhaust pipe of the vehicle and is reused on another vehicle. Since there is a large amount of hydrocarbons in new engines the exhaust gas cleaning device can only be reused a few times if it is mostly used in connection with new vehicles. When the exhaust gas cleaning device is considered worn out it is removed from the adapter and destroyed by means of incineration, which is possible since the entire exhaust gas cleaning device is made of combustible materials.

It will be appreciated that a number of modifications of the embodiment described above are possible within the scope of the invention as defined by the appended claims. For example, the microfilter 2 and the carbon body 3 can be mounted inside the filter housing 4 by means of a conventional rubber seal. Furthermore, the filter housing 4 can be in the shape of a sleeve, which

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can be made of a combustible polymer, such as polypropylene or a recovered polymer. Moreover, the filter housing and the fastening member can be made in one piece and, in that case, are suitably made of a polymer. It is also possible to design the exhaust gas cleaning device according to the present invention in such a way that only the microfilter 2 and the carbon body 3 are replaced when the degree of separation of particles and/or gaseous pollutants is below predetermined limit values, i.e. the filter housing and the fastening member are provided with a new microfilter and a new carbon filter. In the latter variant, the filter unit which is completely destructible by means of incineration only comprises the microfilter and the carbon body. It is also possible to provide the exhaust gas cleaning device with a transportation safety device in the form of a plastic cover, which is placed inside the filter housing 4 downstream of the carbon body 3 prior to using the exhaust gas cleaning device.

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CLAIMS

1. A device for cleaning exhaust gases from vehicles, especially cars, adapted to be temporarily arranged adjacent to the exhaust pipe of the vehicles and comprising a filter unit (1) with a first part (2) for separation of particulate pollutants and a second part (3) for separation of gaseous pollutants, such as hydrocarbons, the filter unit also comprising a filter housing (4), in which the first (2) and second (3) parts are arranged, characterised in that the filter unit (1) is made of a material which is completely destructible by means of incineration, and the second part (3) comprises a body containing immobilised activated carbon evenly distributed in the body.

2. A device according to claim 1, characterised in that the filter housing (4) is made of a material which is completely destructible by means of incineration.

3. A device according to claim 2, characterised in that the filter housing (4) is made of board.

4. A device according to claim 2, characterised in that the filter housing (4) is made of a combustible polymer.

5. A device according to claim 4, characterised in that the filter housing (4) is made of a recovered polymer or polypropylene.

6. A device according to any one of claims 2-5, characterised in that the filter housing is made in the shape of a tube (4) or sleeve.

7. A device according to any one of the preceding claims, characterised in that said body (3) comprises activated carbon combined with a carrier material.

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8. A device according to claim 7, c h a r a c -
t e r i s e d in that the activated carbon is cross-
linked with a polymer.

9. A device according to any one of the preceding
5 claims, c h a r a c t e r i s e d in that said first part
comprises a microfilter (2), such as a HEPA filter.

10. A device according to any one of claims 2-9,
c h a r a c t e r i s e d in that the first (2) and the
second (3) parts are attached to the filter housing (4)
10 by means of gluing.

11. A device according to any one of the preceding
claims, c h a r a c t e r i s e d by a fastening member
(5) for attaching the filter unit (1) to the exhaust gas
system of the vehicle in question by means of an adapter.

15 12. A device according to claim 11, c h a r a c -
t e r i s e d in that the fastening member (5) is made
of a material which is completely destructible by means
of incineration.

20 13. A device according to claim 12, c h a r a c -
t e r i s e d in that the fastening member (5) is made
of a combustible polymer.

14. A device according to claim 13, c h a r a c -
t e r i s e d in that the polymer consists of a recover-
ed polymer.

25 15. A device according to claim 13, c h a r a c -
t e r i s e d in that the polymer consists of polypropy-
lenè.

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ABSTRACT

The invention relates to a device for cleaning exhaust gases from vehicles, especially cars, which is intended to be temporarily arranged adjacent to the exhaust pipe of the vehicles, comprising a filter unit with a first part for separation of particles and a second part for separation of gaseous pollutants, such as hydrocarbons. The filter unit also comprises a filter housing, in which the first and second parts are arranged. The filter unit is made of a material which is completely destructible by means of incineration, while the second part comprises a body, containing immobilized activated carbon evenly distributed in the body.

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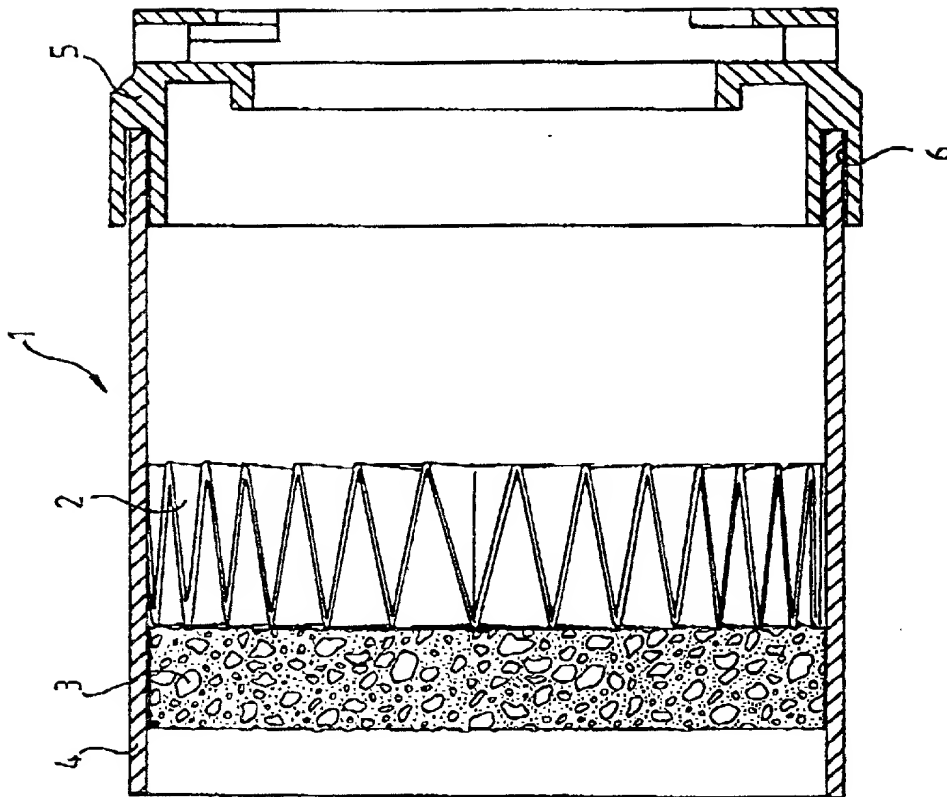
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As a belated na

As a ~~believe~~ named inventor, I hereby declare that:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled
EXHAUST GAS FILTER TEMPORARILY ARRANGED AT A VEHICLE EXHAUST PIPE

(check one) ☐ is attached hereto.

☐ was previously filed. U.S. serial number not yet available to applicant. A copy of the specification as filed is attached for identification purposes.

☒ was filed on ...September 26, 2000 Attorney Docket No. 11796

☐ was filed on ... Under Application Serial No.

[illegible]

Prior US Provisional or Foreign Application(s):

9801079-6 Swedish 03/27/1998

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

1st

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 Inventor's signature: [Signature] Date: 001010
 Residence (City & Country): Sandared, Sweden SEX: SEX Citizenship: Swedish
 Post Office Address: Strandvägen 30, SE-510 40 Sandared, Sweden

2nd

Full name of sole or second inventor: LINDOVIST, Martin
 Inventor's signature: [Signature] Date: 001010
 Residence (City & Country): Överlida, Sweden SEX: SEX Citizenship: Swedish
 Post Office Address: Ringvägen 13, SE-512 60 Överlida, Sweden

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Full name of sole or third inventor: _____
 Inventor's signature: _____ Date: _____
 Residence (City & Country): _____ Citizenship: Swedish
 Post Office Address: _____

Full name of sole or fourth inventor: _____
 Inventor's signature: _____ Date: _____
 Residence (City & Country): _____ Citizenship: _____
 Post Office Address: _____

Full name of sole or fifth inventor: _____
 Inventor's signature: _____ Date: _____
 Residence (City & Country): _____ Citizenship: _____
 Post Office Address: _____

Full name of sole or sixth inventor: _____
 Inventor's signature: _____ Date: _____
 Residence (City & Country): _____ Citizenship: _____
 Post Office Address: _____

Full name of sole or seventh inventor: _____
 Inventor's signature: _____ Date: _____
 Residence (City & Country): _____ Citizenship: _____
 Post Office Address: _____